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Relationship between ICT Innovation and Data Analytics in Promoting Business Growth

By
Corresponding authors: Maryam Folakemi Adepoju[1], Abdullateef Ajibola Adepoju[2], Aliyu Mohammed[3]
[1]11 Umaru Muhammadu Street, 65 NNDC Quarters, Hotoro GRA, Kano, Kano State, Nigeria.
[2]Randatech Systems Ltd, Gidan Nasir Ahmed, No. 3 Zaria Road, Opposite Ja'oji Quarters, Kano, Nigeria.
[3]Department of Management, School of Arts, Management and Social Sciences, Skyline University Nigeria, Kano.

ABSTRACT: In contemporary business world, technological advancements and one upmanship are very rapid and particularly in the case of startups and small and medium-sized enterprises (SMEs). The key to growth removal and competitiveness is Information and Communication Technology (ICT) innovation and strategic use of data analytics, in the first place. This hypothetical research paper discusses the correlation between ICT innovation and data analytics in the development of business in what is already the emerging economies as the primary audience but the West Africa and Nigeria specifically. The study uses peer-reviewed journals, books, industry reports, and historical analysis in order to amalgamate previously learned facts, as part of the conceptual research method. The results indicate that the innovations of ICTs, including the application of cloud computing, artificial intelligence, automation and digital platforms, are the strategic resources, which enhance the operational efficiency and competitive advantage, and the process of implementing the data analytics enables the firms to transform the technological capabilities into actionable insights, inform the use of informed decision-making, market growth and innovation successes. The research also indicates that there are some pivotal drivers and obstacles that influence integration of ICT and analytics in business activities. It is upon these insights, recommendations are given to the entrepreneur, the business leader, and the policy makers to enable them make good use of ICT and data analytics to attain sustainable growth, improved performance, and competitiveness in the future.

KEYWORDS: ICT Innovation, Data Analytics, Business Growth, Startups, Emerging Economies.

INTRODUCTION

1.1 Background of the Study

The growth of the business market at an international level has been the dominant influence of technological innovation and application of the information and technology (ICT) in the time of the Fourth Industrial Revolution (Gul and Al-Faryan, 2023; Du, Xu, and Yuan, 2024). The topics of big data analytics and automation are increasingly utilized by businesses to produce a more efficient operation, enhanced decision-making and sustainable growth (Capurro, Fiorentino, Garzella, and Giudici, 2022; Lu, Xiao, Yu, and Ren, 2023). Internationally, companies whose alliances integrate ICT-based innovations and processes to analyze data are in a better position to address market changes and more effective in terms of resource optimization and creation of products and services (Demirkan et al., 2015; Bertello, Ferraris, Bresciani, and De Bernardi, 2021). The major enablers that are pinpointed in the developing regions such as Africa are technological adoption and digital transformation as the most relevant enablers in economic and business development. However,

difficulties such as infrastructural deficit, skill gaps, and lack of awareness in applying ICT and data analytics often hinder the effective application of ICT and data analytics in business operations (Verma & Bhattacharyya, 2017; Aldulaimi, Kharabsheh, & Alazzawi, 2020). Despite all these challenges, emerging economies are experiencing a high digital penetration especially in sectors such as banking, telecommunication, and e-commerce, which are using ICT innovations to bring about competitiveness and efficiency (Gul & Al-Faryan, 2023; Waqar & Paracha, 2024).

In West Africa, the proliferation of startups and small and middle-sized enterprises (SMEs) has brought on concerns on the role that digitalization and data are playing towards making business scalable and sustainable (Muhammed, Sundararajan, & Lawal, 2022; Shanmugam Sundararajan et al., 2024). Firms with big data analytics and ICT innovations exhibit enhanced productivity, innovation capabilities and responsiveness to the marketplace (Turi, Khwaja, Tariq, & Hameed, 2023; Mohammed, 2023). Nevertheless, there are factors that continue to influence rates of adoption, as well as the successful utilization of digital solutions, including financial readiness, technological complexity, and managerial support (Waqar & Paracha, 2024; Verma & Bhattacharyya, 2017). In Nigeria, leveraging ICT and data analytics is increasingly being accepted as a strategic lever for the growth of start-ups and SMEs. Studies have determined that entrepreneurial ventures and digital startups gain a lot from the integration of technology with these ventures as they support improvement in operational efficiency, innovation, and market competitiveness (Mohammed & Sundararajan, 2023; Aliyu Mohammed, 2024). However, there are challenges such as inadequate training, infrastructural challenges and managerial capacity gaps that continue to be significant barriers to the widespread implementation of ICT innovations and analytics-driven decision-making in Nigerian businesses (Muhammed, Sundararajan, & Lawal, 2022; Sundararajan, Mohammed, & Senthil Kumar, 2023).

Against this background, it is important to grasp how ICT innovation and data analytics relate to each other as a key influence in addressing sustainable business growth in developing economies especially among startups and SMEs. Having the synergies of ICT and analytics, not only helps to increase performance of businesses but also prepares the firms to compete in the field of ever-evolving world in which everyone is speaking digital languages and data (Gul & Al-Faryan, 2023; Du, Xu, & Yuan, 2024).

1.2 Problem Statement

Despite the known potential of ICT innovation and data analytics in business growth, startups and SMEs of developing economies continue to experience challenges in successfully harnessing these technologies in business (Waqar & Paracha, 2024; Verma & Bhattacharyya, 2017). Worldwide, companies that combine technological innovation and data-driven decision-making enjoy improved productivity, operational efficiency, and market responsiveness Gul & Al-Faryan (2023). Lu, Xiao, Yu, and Ren (2023). However, these advantages are unevenly achieved in Africa and Nigeria, particularly, West Africa and Nigeria, owing to limited infrastructure, limited managerial skills, financial issues, and lack of adoption of improved ICT systems (Aldulaimi, Kharabsheh, & Alazzawi, 2020; Muhammed, Sundararajan, & Lawal, 2022). In Nigeria, while digital startups and SMEs are gradually adopting ICT and data analytics for a better growth, competitiveness, and innovation, the adoption step involves getting to know certain technological complications, inadequate training, lack of strategic orientation towards data analytics-driven growth (Mohammed and Sundararajan, 2023; Shanmugam Sundararajan et al., 2024).

Furthermore, the current research studies indicate that although the level of digitalization would positively affect the level of performance, the synergy between the two pertinent areas of ICT innovations and data analytics ability in fostering the sustainable growth of business is yet to be adequately addressed in the Nigerian context (Turi, Khwaja, Tariq, & Hameed, 2023; Aliyu Mohammed, 2024). This gap suggests a strong need for research on the collective impact of ICT innovation and data analytics on businesses, especially startups and SMEs in Nigeria to gain actionable insight for that practitioners, policymakers and researchers that are interested in

stimulating a digital economy and entrepreneurial ecosystem that is characterized by innovation and data-driven decision making.

1.3 Significance of the Study

This study has several reasons why it is relevant. To start with, technological innovation and data analytics have become one of the basic engines of business expansion in the global scale since they enable companies to streamline their activities, make decisions efficiently, and increase their competitiveness in the context of highly dynamic markets (Gul and Al-Faryan 2023 Understanding the interaction of ICT innovation and data analytics provide important information on how companies can strategically leverage the resources and achieve sustainable growth (Capurro, Fiorentino, Garzella, and Giudici, 2022). Second, businesses in the African region and the West African nation of Nigeria, in particular, face perpetual difficulties with the implementation of progressive ICT applications and use of data to make business-related decisions because of infrastructural, financial and technical constraints (Aldulaimi, Kharabsheh, and Alazzawi, 2020; Muhammed, Sundararajan and Lawal, 2022). The current study works towards this gap in knowledge as it attempts to comprehend how ICT innovation connects to the idea of data analytics because it encourages business expansion in emerging economies (Mohammed and Sundararajan, 2023; Waqar and Paracha, 2024).

Thirdly, the research has practice implications of start-ups and SMEs. The findings of this study may assist business leaders with the development of an effective way of approaching the multiplication of the ICT and integration of data analytics in order to enhance the effectiveness of operations, product innovation, and performance within the market (Turi, Khwaja, Tariq, and Hameed, 2023; Verma and Bhattacharyya, 2017). Besides, the policymakers can use the findings to create appropriate changes to the industry by formulating favorable digital infrastructure policies, capacity development and innovation-driven incentives to strengthen the entrepreneurial ecosystem (Aliyu Mohammed, 2023; Shanmugam Sundararajan et al., 2024). Lastly, theoretically, the study is added to the body of ICT innovation, data-driven decision-making and business development since it provides a holistic view of how the variables relate to each other in order to achieve a sustainable growth of the emerging economies. The overall findings will furnish a research framework and a point of reference to the future studies in the area of digital entrepreneurship and innovation management.

1.4 Research Objectives

The primary aim of the research is to review the connection between ICT innovation and data analytics in spurring business development. The targeted objectives are:

1. To investigate how ICT innovation can be used to improve the operation efficiency, competitiveness, and market sensitivity in start ups and SMEs across the world and Nigeria.
2. To estimate the difference in ability to make informed decisions and sustainable business development when implementing data analytics.
3. To determine the key factors and obstacles that would determine the penetration of ICT innovation and data analytics in West African and Nigerian business setting.
4. To discuss the role of the synergy in ICT innovation and data analytics in promoting the innovation-based and sustainable business growth.
5. To present practical suggestions to the policymakers, entrepreneurs, and business leaders on how to use ICT and data analytics to improve business operations and take-off.

1.5 Research Questions

The research questions that are proposed in the study are as follows:

1. What effect does the innovation in the ICT have on the business development of startups and SMEs worldwide, in Africa and in Nigeria particularly?
2. How does the adoption of data analytics impact business decision make and business performance outcomes?
3. What are the key forces and obstacles to the adoption of ICT innovation and data analytics of businesses in West Africa and Nigeria?
4. How do ICT innovation and data analytics interrelate in order to achieve sustainable business growth and competitive advantage?
5. Which policy, managerial, and practical interventions are likely to increase the efficient utilization of ICT innovation and data analytics to grow the business?

2.0 Literature Review

2.1 Conceptual Review

2.1.1 ICT Innovation

Definition and Evolution of ICT Innovation in Business

Digital tools, platforms and technologies as used in the enhancement of processes, products and services of organizations form part of Information and Communication Technology (ICT) innovation. Innovation of ICT across the globe has ceased to be just automation of tasks, but an integrated system incorporating cloud computing, artificial intelligence (AI) and big data analytics with automation. As Mohammed (2023) opines, ICT utilization enables the businesses to have simplified operations and faster responsiveness and improved performance. ICT-based innovation is a technological change, as well as a strategic means of achieving a competitive advantage and sustainable development (Rajapathirana and Hui, 2018; Gul and Al-Faryan, 2023).

Digital Tools, Platforms, Cloud Computing, AI, and Automation

The current business environment heavily relies on technology and digital tools and platforms to operate its business effectively. Cloud computing provides available and scalable IT solutions and is cost-effective in terms of operation and accessibility of information (Mohammed, 2023). Predictive analytics, optimisation of processes and improved decision-making can be applied with the help of AI and automation technologies, which can enable organisations to respond promptly to customer demand and changing requirements (Lu, Xiao, Yu, and Ren, 2023). These technologies can be combined to support innovation in business processes, better productivity, and data-driven strategies (Capurro, Fiorentino, Garzella, and Giudici, 2022).

Innovation in IT Infrastructure and Business Processes

ICT innovation is not technology adoption, but also reconfiguring both IT infrastructure and business operations. Firstly, companies using agile performance management systems, integrated enterprise systems, and ICT advanced solutions tend to be in a better position to use the existing knowledge in organizations to foster improved collaboration processes and workflows (Aliyu Mohammed, 2023; Shanmugam Sundararajan et al., 2024). The dynamic approach of the ICT infrastructure helps firms especially startups and SMEs to remain competitive in fast-changing markets (Mohammed & Sundararajan, 2023).

Role of ICT in Operational Efficiency and Competitive Advantage

The adoption of ICT innovation is playing a vital role in operational efficiency, decrease in cost, and product and service quality. It helps the businesses in making informed decisions using real-time data and analytics (Gul & Al-Faryan, 2023). Additionally, ICT innovation helps in achieving competitive advantage as it supports enabling firms differentiate their offering, respond swiftly to market changes and exploit tech capacities for sustainable growth (Turi, Khwaja, Tariq, & Hameed, 2023). In the West Africa and Nigeria, the strategic use of ICT innovation stands a chance of revolutionizing the digital transformation and entrepreneurial practices and enhancing performances of startups in spite of infrastructural and environmental challenges (Aliyu Mohammed, 2024; Waqar & Paracha, 2024).

2.1.2 Data Analytics

Concept and Scope of Big Data and Analytics

Data analytics is the systematic computational analysis of vast and intricate data (big data) to identify patterns, correlations and insights which are used to make business decisions. Globally, big data analytics (BDA) has become a strategic resource that enables organizations to process datasets in real time, which are semi-structured and unstructured, to improve performance and competitiveness (Bertello, Ferraris, Bresciani, & De Bernardi, 2021; Gul & Al-Faryan, 2023). In the context of startups and SME, Data analytics is especially important for resource optimization and market analysis as well as operational improvement (Verma & Bhattacharyya, 2017). In West Africa and Nigeria, the uptake of BDA is still nascent, and firms are encountering both technological, organizational and environmental barriers, however, the potential of gaining improved business insights and performance is significant (Aliyu Mohammed, 2024; Shanmugam Sundararajan et al., 2024).

Applications in Decision-Making, Forecasting, and Strategic Planning

Big data analytics helps businesses make a shift from an intuitive decision to an evidence-based decision. By aggregating information from various

sources, companies are able to predict their demand, detect emerging trends in their markets, and plan their strategies with greater precision (Gul & Al-Faryan, 2023; Capurro, Fiorentino, Garzella, & Giudici, 2022). For example, in the banking industry, it has been proven that data-driven decision making (DDM) that is supported by analytics capabilities can enhance productivity by about 9-10% (Gul & Al-Faryan, 2023). Similarly, startups that use analytics for operational and strategic decisions can realize global extent resource allocation and heightened market sensitivity (Ji, Yu, Tan, Kumar, & Gupta, 2024).

Types of Analytics (Descriptive, Predictive, Prescriptive)

Data analytics can be divided into three major types:

1. **Descriptive Analytics:** Understanding past and current business performance through the historical data analysis (Awamleh, Alarabiat, & Bustami, 2024).
2. **Predictive Analytics:** Trees and bottom-down modeling, a method to predict future outcomes based on statistical models and machine learning techniques (Bertello et al., 2021).
3. **Prescriptive Analytics:** Making recommendations that can be used to make the best decision, through deriving insights from data and often include some form of simulation and optimization (Ji et al., 2024).

Collectively, these analytics forms enable enterprises to be more effective in their functioning, reduce threats and make proactive choices so that to sustain the business development.

Data-Driven Innovation and Its Link to Business Performance

A combination of data analytics and innovation is a good basis of business growth. Innovation based on data will assist companies to reverse-engineer products and services by keeping them as close to market issues as achievable - reduces the possibility of introducing a malfunction, which only increases at a sustainable level of operation (Capurro et al., 2022; Lu, Xiao, Yu, and Ren, 2023). Big data capacities when linked with organizational agility and ICT infrastructure has been shown to have a positive effect on the firm's performance in various sectors (Turi, Khwaja, Tariq, & Hameed, 2023; Waqar & Paracha, 2024). With emerging economies, such as Nigeria and also West Africa at large, startups that manage effectively tap the potential of BDA and data-driven insights can obtain competitive benefits, operational efficiencies, and sustainable business expansion (Aliyu Mohammed, 2024; Shanmugam Sundararajan et al., 2024).

2.1.3 Business Growth

Definition and Dimensions of Business Growth

Business growth is a phenomenon where companies are able to expand in terms of their size, position in the market or in terms of their profitability and competitiveness over time. It is multidimensional involving financial performance (e.g. revenue, profitability), market expansion (e.g. customer base, geographic reach) and innovation output (e.g. new products, services or processes) (Rajapathirana & Hui, 2018; Alheet and Hamdan, 2020). Research on Business Ethics Around the World In 2023, the globally measured sustainable business growth relies more on technological and data-driven capabilities to enable firms to quickly adapt when market conditions change (Gul & Al-Faryan, 2023). In the continent of Africa and especially Nigeria and West Africa, due to infrastructural limitations and the lack of advanced information and communication technology tools (ICTs), there are specific challenges that startups face for scaling their growth, i.e., the need for innovation and data-driven strategies (Aliyu Mohammed, 2024; Shanmugam Sundararajan et al., 2024).

Role of ICT and Analytics in Promoting Business Scalability and Sustainability

ICT innovation and data analytics have become a must-have enabler of business growth and long-term sustainability. ICT can enable operational efficiency, resources optimization, and real-time communications, and data analytics can offer actionable insights to perform strategic decision-making (Demirkan et al., 2015; Waqar & Paracha, 2024). The synergy of ICT and analytics is promoting agile processes, market trend prediction and implementation of innovative business models by firms to both enhance short term performance and gain sustainable competitive advantage (Aliyu Mohammed, 2023; Turi, Khwaja, Tariq, & Hameed, 2023). For startups, this combination enables the potential for scalable growth by

enabling the possibility to rapidly experiment, be responsive to the market, and allocate resources appropriately (Lu, Xiao, Yu, & Ren, 2023; Capurro et al., 2022).

Measurement Indicators

Business growth can be measured by a number of quantitative and qualitative indicators:

1. **Revenue Growth:** Changes in sales and general turnover are indicators of market acceptance and effectiveness of operations (Mohammed, 2023; Lawal, Abdulsalam, Mohammed, & Sundararajan, 2023).
2. **Market Share Expansion:** Expansion in customer base and geographical location represent the position of that company within a competitive setting as well as market penetration (Shanmugam Sundararajan et al. 2024; Aliyu Mohammed 2023).
3. **Innovation Outcomes:** Number of new products, services, patents, or process improvements reflect the ability of the firm to innovate and create value (Rajapathirana & Hui, 2018; Alheet & Hamdan, 2020).

The bonding of innovation in ICT and the application of data analytics can be considered as a core object in promoting these indicators which assist save startups as well as later established companies to reach their own solution for measurable business growth with maintaining sustainability at the tender latency of rapidly evolving and competitive economies (Gul and Al-Faryan, 2023; Mohammed and Sundararajan, 2023).

2.2 Theoretical Framework

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Davis (1989), is a known theory of understanding the adoption and usage of technological tools in organizations. TAM postulates that perceived usefulness and perceived ease of use are the most important factors in determining technology acceptance. In terms of ICT innovation, TAM offers a lens to study how businesses, in particular startups, adopt digital tools, cloud computing, AI, and automation in order to become more efficient in their operations and decision-making (Waqar and Paracha, 2024; Gul and Al-Faryan, 2023). By using TAM, this research examines the values and usability of information communication and technology (ICT) systems in determining firms' willingness to incorporate data analytics in their business operations, which is a key to boosting business growth (Demirkan et al., 2015; Capurro et al., 2022).

Resource-Based View (RBV)

The Resource-Based View or RBV as put forward by Wernerfelt (1984) and Barney (1991) focus on the strategic importance of firm-specific resources and capabilities in attaining sustainable competitive advantage. ICT innovation and data analytics capacities are classified as strategic assets following RBV as they are valued, rare, inimitable and non-substitutable (Aliyu Mohammed, 2023; Turi, Khwaja, Tariq, & Hameed, 2023). Through effective usage of these resources, organization can benefit from the enhanced efficiency in their operations, new innovative process beneficial for the organization as well as the actionable insights resulting in driving short-term performance and growths of long-term significance (Lu, Xiao, Yu, & Ren, 2023; Rajapathiran & Hui, 2018). In developing economies like Nigeria's where there is lack of resources ICT and analytics capability can foster unique competitive advantage that is difficult to match for competing businesses (Shanmugam Sundararajan et al., 2024).

Rationale for Selecting These Theories

The combination of TAM and RBV gives a good theoretical lens to this study. TAM accounts for behavioral intention of firms to the scenario of ICT tools and analytics adoption while RBV highlights the strategic relevance of these technological resources in attaining a sustainable growth. Together, these frameworks facilitate a comprehensive understanding of the way ICT innovation and data analytics not only shape the effect of the adoption behaviour but simultaneously result in tangible business outcome in terms of an enhanced revenue, market share and innovation results (Mohammed & Sundararajan, 2023; Lawal, Abdulsalam, Mohammed, & Sundararajan, 2023). This dual-theory is most pertinent for startups and SMEs in Africa and other emerging economies to aid their business success as technology adoption and strategic resources management are key drivers of business survival (Aliyu Mohammed, 2024; Gul & Al-Faryan, 2023).

2.3 Linkages Between Theories, IVs, and DV

ICT Innovation and Sustainable Competitive Advantage (RBV)

In the Resource-Based View (RBV) ICT innovation is defined as a strategic resource with characteristics that make it valuable, rare, inimitable and non-substitutable and can supply firms with sustainable competitive advantage (Wernerfelt, 1984; Barney, 1991). In practice, the innovation in IT infrastructure, cloud computing, artificial intelligence, automation and digital platforms allow firms to optimize processes, to save operation costs, and to enhance service delivery. These capabilities enable businesses to stand out in competitive markets and to evolve and adapt to changes in the environment (Aliyu Mohammed, 2023; Kumar, Mohammed, Raj, & Sundaravadivazhagan, 2024). By innovation ICT systems continually, there are opportunities for firms to establish their long-term resource-based advantages where competitors cannot easily copy, which is very important for startups and SMEs as they are struggling to establish themselves in African and emerging markets (Shanmugam Sundararajan, Mohammed, & Senthil Kumar, 2023).

Data Analytics Adoption and Business Performance (TAM)

TAM emphasizes the adoption of technological innovations as being largely dictated by perceived usefulness and perceived ease of use (Davis, 1989). Data analytics adoption, being an extension of ICT innovation, allows companies to make informed, data-driven decisions that will improve forecasting, resources, understand customers and plan strategies (Waqar & Paracha, 2024; Gul & Al-Faryan, 2023). Firms that understand the value of analytics are more likely to incorporate these capabilities into their day-to-day operations, and translate technology adoption into better business performance. Empirical studies have revealed that organizations that use data analytics have reported to have experienced more productivity, better market responsiveness and higher innovation output (Demirkan et al., 2015; Turi, Khwaja, Tariq, & Hameed, 2023).

Integrated Model Linking ICT Innovation and Data Analytics to Business Growth

The integration of RBV and TAM allow viewing the incremental impact on the business development by both the factors of ICT innovation and data analytics as whole. ICT innovation (IV1) is the basic technological capability that makes up strategic resources, and data analytics (IV2) is the behavioral adoption mechanism that develops strategic resources into the form of actionable insights. Together, these variables are driving business growth (DV) by enhancing financial performance, market expansion and innovation outcomes (Mohammed & Sundararajan, 2023; Lawal, Abdulsalam, Mohammed, & Sundararajan, 2023). The integrated model proposes that startups and SMEs that make good use of ICT innovations and analytics tools are able to scale, sustainably grow, outperform their competitors, and achieve resilience in rapidly changing markets (Aliyu Mohammed, 2024; Shanmugam Sundararajan et al., 2024).

Conceptual Linkage:

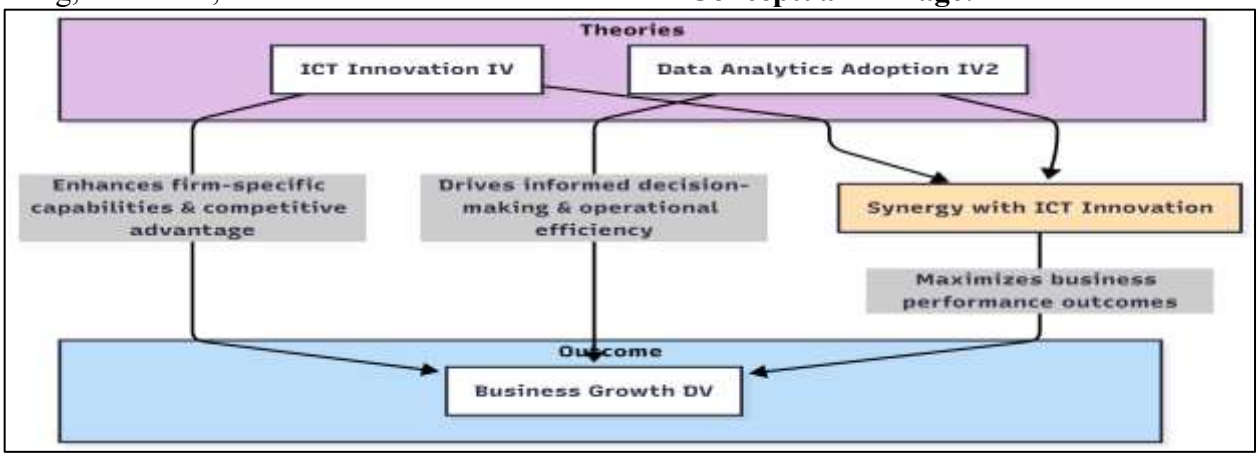

Figure 1: Conceptual Linkage Between ICT Innovation, Data Analytics, and Business Growth
Source: Developed by the authors based on Davis (1989), Wernerfelt (1984), Barney (1991), Aliyu Mohammed (2023), Waqar & Paracha (2024), and Shanmugam Sundararajan et al. (2023).

Figure 1 shows the integrated conceptual model between ICT innovation and data analytics adoption on business growth. ICT innovation (IV1) is strategic technological resources, according to the Resource-Based View (RBV) as innovation of ICT will enhance firm specific capabilities, competitive advantage and operational efficiency. Data analytics adoption (IV2), based on the Technology Acceptance Model (TAM), helps firms use data for making informed decisions, forecasting, and strategic plans to turn technological potential into action. The diagram is a synergistic association among Innovation of ICT and data analytics where when well-integrated will also concurrently fulfil performance outcomes to businesses in terms of financial growth in factors of market expansion and innovation output. This understanding signal shows the critical aspect of technology-enhanced capabilities and adoption behavior in sustainable business growth particularly in new business and SMEs in emerging and African markets.

2.4 Empirical Review

A number of empirical studies have demonstrated that ICT innovation has the positive impact on business development across industries and regions. Internationally, competitors that make use of ICT tools, such as cloud computing, artificial intelligence (AI), automation, and online tools have mind-blowing outcomes, such as efficacy in operations, enhanced service delivery, and sustainability in the attainment of a competitive advantage (Aliyu Mohammed, 2023; Kumar et al., 2024). Similarly, adoption of data analytics has been proven to help improve decision-making, resources, forecasting, and strategic planning for businesses and driving performance (Waqar & Paracha, 2024; Gul & Al-Faryan, 2023). In the emerging economies, which comprises Africa and Nigeria, empirical evidence underscores the fact that startups and SMEs that are able to integrate the functionality of ICT innovation with data-driven analytics parameters enjoy substantial market responsiveness, innovation outcomes, and scalability (Shanmugam Sundararajan, Mohammed, & Senthil Kumar, 2023; Mohammed & Sundararajan, 2023). Studies focusing on the financial, manufacturing and IT industries show that the technological infrastructure and analytics capability combine is crucial in order to grow sustainably especially within highly competitive and resource constrained markets (Lawal, Abdulsalam, Mohammed, & Sundararajan, 2023; Aliyu Mohammed, 2024). Furthermore, works in service industries and banks have demonstrated that data-driven decision making (DDM) is beneficial for productivity improvement and strategic fit, confirming the centrality of analytics in current business works (Gul & Al-Faryan, 2023; Turi, Khwaja, Tariq, & Hameed, 2023). Overall, the empirical literature has established that ICT innovation and data analytics separately make a contribution to business growth, but the impact of their integration has not been well studied, particularly in the context of developing and emerging markets.

2.5 Research Gap

Despite a lot of research on ICT innovation and data analytics individually, there was a significant lack of interest in studying ICT innovation and data analytics dynamics together and how this affects business growth. Conceptually most of the studies are concerned with either technological resources (ICT innovation) or behaviors towards adoption (data analytics) without combining the two in a coherent model (Aliyu Mohammed, 2023; Waqar & Paracha, 2024). Contextually, scarce research covers new economies, especially in West African country together with Nigeria, where infrastructure, regulatory frameworks and resources may have an effect on the adoption-performance link (Shanmugam Sundararajan et al., 2023; Mohammed & Sundararajan, 2023). Theoretically, while the Resource-Based View (RBV) and Technology Acceptance Model (TAM) are popularly used, there are limited cases of explicit integration of the two theories to describe the collective effect ICT innovation and data analytics have on business growth. Methodologically, there is a shortage of the empirical research approaches that used combined frameworks or multiple-industry analysis that accommodates both technology adoption and analytics usage. This study attempts to address these shortcomings by elaborating a conceptual model to link ICT innovation and data analytics adoption to business growth in order to provide insights for startups and SMEs in emerging markets, as well as a theoretical and a practical foundation for future research.

2.6 Conceptual Framework

The conceptual framework as proposed shows the integrated relationship between the relationship between ICT Innovation (IV1) and Data Analytics (IV2) in promoting Business Growth (DV). ICT innovation offers the technological infrastructure such as cloud computing, AI, automation, and digital platforms, which is a strategic resource that improves the operational efficiency and competitive advantage (Aliyu Mohammed, 2023; Kumar, Mohammed, Raj, & Sundar avadivazhagan, 2024). Data Analytics adoption is making businesses immensely exploit this technological base, in data-driven decision making, forecasting and strategic planning, turning into a tangible outcome of ICT capabilities in business unlike ever before (Waqar & Paracha, 2024; Gul & Al-Faryan, 2023). The framework also emphasizes the expected synergistic effect between ICT Innovation and Data Analytics whereby interaction between them maximizes business growth in the terms of improved financial performance, market expansion, and innovation outputs (Mohammed & Sundararajan, 2023; Shanmugam Sundararajan, Mohammed, & Senthil Kumar, 2023).

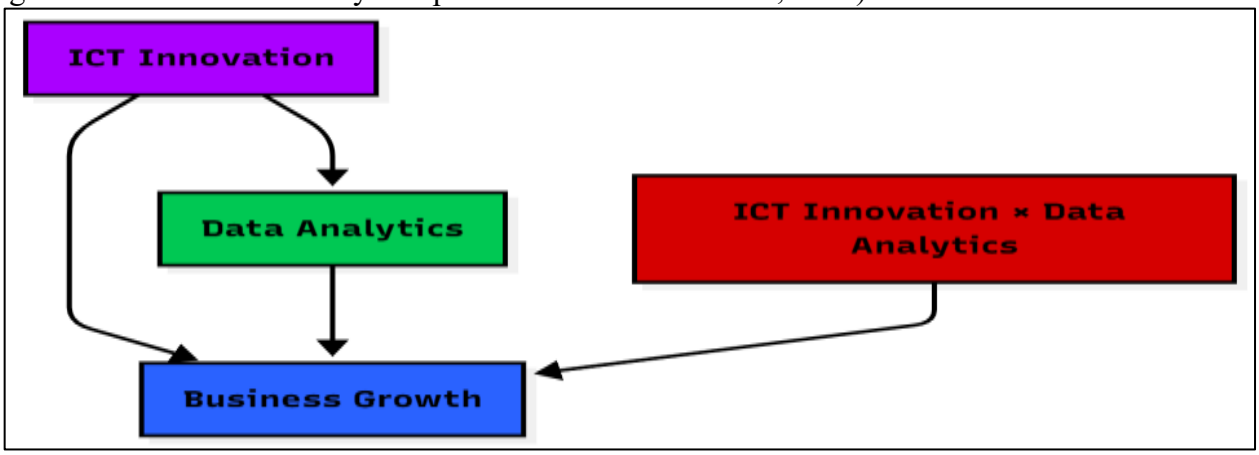

Figure 2: Conceptual Framework Linking ICT Innovation and Data Analytics to Business Growth
Source: Developed by Authors (2025) based on Aliyu Mohammed (2023); Kumar, Mohammed, Raj, & Sundaravadivazhagan (2024); Waqar & Paracha (2024); Gul & Al-Faryan (2023)

Figure 1 shows a conceptual model with ICT Innovation and Data Analytics playing a common role for Business Growth according to the title. ICT Innovation is a foundational resource in which strategic technological capabilities are made available; while Data Analytics is the behavioral adoption mechanism by which those capabilities are changed to actionable insights. The directional arrows show that ICT Innovation and Data Analytics both independently contribute to the growth of businesses, with the interaction effect expected to have a synergistic impact, improving financial performance, expanding in the market and innovation products. This integrated approach highlights the role of investing in technology infrastructure and analytics capabilities together, particularly for startups and SMEs in emerging economies at the same time as investments in technology, for a sustainable and scalable growth.

3.0 Research Methodology

This research work adopts conceptual method of research which focus on theoretical research on investigating the challenges in the relationship between ICT Innovation, Data Analytics and Business Growth. As a conceptual paper it does not involve collection of primary data, empirical testing and emphasizes on critical synthesis of existing literature, frameworks and theoretical insights to draw integrated understanding of how technological innovations and analytics affect business performance. The approach allows to identify key variables, constructs and relationships that are relevant to startups and SMEs in emerging and developed economies.

The literature selection strategy used a systematic review of scholarly journals, conference proceedings and academic databases such as Scopus, Web of Science, Google Scholar and repositories using specialised databases. Inclusion criteria targeted the set of studies that have been published from 2015 to 2025 that address ICT innovation and big data analytics, technology adoptions and growth of business taking special interest to emerging economies and African based

economies. Exclusion criteria filtered out studies that were not related to the context of technology business linkages, non-peer-reviewed and papers with poor conceptual or theoretical relevance. This strategy allows to ensure that the literature reviewed is not only up-to-date but also directly applicable for the conceptual focus of the study.

The study utilizes conceptual analysis that is used to draw a synthesis of the study's findings based on literature selected for the study. Through thorough analysis of the existing theoretical frameworks (TAM, RBV), empirical evidence and prior conceptual models, it is identified patterns, linkage and interaction effects between ICT Innovation and Data Analytics on business growth. In so doing, a consistent, holistic conceptual map may be created, which may help as a guide to subsequent empirical research, and as a source of action-focused knowledge on the organizational practice. The conceptual analysis is simply an analysis of whether it is clear and theoretically solid or not and as well as applicable to business situations that are emerging in the world.

4.0 Findings of the Study

Following the conceptual combination of ICT Innovation and Data Analytics, the present study anticipates five findings that can be connected with the purpose of the research:

1. **Role of ICT Innovation in Business Growth:** The study will be used to demonstrate that ICT innovations such as cloud computing, artificial intelligence, automation and advanced digital platforms can provide a considerable enhancement in the operational efficiency, competitive power and market responsiveness of startups and small and medium enterprises (SMEs) both in the global market and Nigeria market.
2. **Influence of Data analytics adoption:** It is estimated that the adoption of data analytics will boost the ability to make informed decisions, plan and grow the business in a sustainable way by providing actionable information, predictive forecasting, and opportunities based on data.
3. **Drivers and Barriers to Integration:** The top management is also expected to form the critical drivers and the perceived strategic value and technological readiness each comprising barriers to such drivers, which would be financial, infrastructures barriers, and environmental barriers to integration of ICT innovation and analytics, within the West African and Nigerian business environment.
4. **Synergy, ICT Innovation and data analytics:** There will be an example of synergy in the contribution of the innovation-based and sustainable growth and competitiveness in a business as well as competitive advantage and matching of the technological resources with the adoption behavior.
5. **Research Action Insights to Business Development:** The research is projected to give evidence-based conceptual information to entrepreneurs, startups, and SMEs in terms of how they could leverage the opportunities of ICT and analytics to scale up businesses, improve business performance, and streamline its operation in the market.

5.0 Recommendations of the Study

The research has five key recommendations that it presents in accordance to the expected findings and research goals:

1. **Embracing ICT Innovations:** ICT innovations (cloud computing and AI and automation technology) should be adopted, and organizations need to make sure that they invest and benefit through the gains in operational efficiency and enhanced competitiveness (both locally and globally).
2. **Investment in Analytics Capabilities:** The firms ought to create data analytics capabilities, including predictive, descriptive, and prescriptive analytics capabilities as such that can improve decision-making and innovation processes.
3. **Drivers and Barriers:** Organization will be required to actively participate in the management of drivers, such as leadership support and technological prepareness and barriers that include poor infrastructure, financial limitation and data quality concerns, and West Africa, in particular, and Nigeria.
4. **Sustainable Growth by Leveraging Synergy:** The leveraging of ICT innovation and data analytics needs to be coordinated with the other in terms of the utilization of Maximum Synergy value given the innovation-based and sustainable business growth and long-term competitive advantage.
5. **Policy and Managerial Interventions:** The policy makers, business leaders and

entrepreneur purposes ought to develop infrastructures that support and facilitate the implementation of the technology, offer incentives on integrating ICT and analytics in promoting the technology and uniting knowledge sharing to facilitate the efficient scaling of the startups and SME.

The recommendations are precisely related to the study objectives in such a way that theoretical results are translated into the strategies that can be implemented in practice in the both emerging and developed economies.

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